

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte MICHAEL W. LONG and KENNETH G. MANN

Appeal No. 2002-0766
Application No. 08/793,053

ON BRIEF

Before WINTERS, WILLIAM F. SMITH, and GRIMES, Administrative Patent Judges.

GRIMES, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 89 and 91-100, all of the claims remaining. Claim 89 is representative and reads as follows:

89. A method for identifying a subject at risk of developing an age-related bone disorder, comprising the steps of:

obtaining a population of cells from said subject that includes bone precursor cells;

enriching said population of cells for human bone precursor cells; and

quantifying the amount of osteocalcin or osteonectin expressed by said bone precursor cells,

wherein an increased amount of osteocalcin or osteonectin, in comparison to the amount expressed by the bone precursor cells of a young or middle-aged person, is indicative of said subject being at risk of developing an age-related bone disorder.

The examiner does not rely on any references.

Claims 89 and 91-100 stand rejected under 35 U.S.C. § 112, first paragraph, as nonenabled.

We reverse.

Background

“The process of aging in general is associated with a progressive diminution of bone-accumulation capacity.” Specification, page 3. “Reductions in osteoblast function or numbers, of necessity, leads [sic] to the loss of bone-forming capacity. . . . Bone cells from older individuals, in vitro, have the capacity to respond to growth factors, but their synthetic and proliferative capacity is diminished. . . . This results in diminished bone precursor cell and osteoblast numbers.” Id.

“A number of non-collagenous matrix proteins . . . are involved in bone formation. Osteonectin . . . is believed to initiate nucleation during the mineral phase of bone deposition. . . . Bone gla-protein (BGP, osteocalcin) . . . is specific for bone and may regulate Ca⁺⁺ deposition.” Id., pages 8-9. The specification discloses that “osteonectin and osteocalcin antigenic expression by human preosteoblast cells increases with increasing age.” Page 38.¹ The specification

¹ “A preosteoblast is a cell that differentiates into an osteoblast.” Specification, page 32. Bone precursor cells include preosteoblasts and other types of cells. Id.

also discloses that a subset of those tested over age 60 showed decreased expression of osteocalcin and osteonectin by preosteoblasts. See pages 40-41.

The specification concludes that

these aspects of the invention have diagnostic and, perhaps, prognostic utility in connection with certain bone disorders. For example, the use of multi-parameter flow cytometry and immunophenotyping [sic] may allow the diagnosis and prediction of outcomes (prognosis) of various bone disorders such as primary osteoporosis. . . . The pattern of antigenic expression in human bone precursor cells observed by the inventors shows that elderly individuals (≥ 60 years of age) are of two types: those with statistically high bone antigen content, and those with significantly low antigen content (compared to age-matched controls). This suggests that these values may reflect the disease status of the affected individual's bone function.

Page 41. See also page 72:

The physiological and clinical significance of such alterations may be that the immunophenotype of these two populations of elderly individuals reflects the status of their bone cell function. In their fifties or sixties, most individuals (male and female) show varying degrees of osteoporosis. Thus, the identification of alterations in bone protein expression undoubtedly demonstrates the basis for known elevations in these proteins (osteocalcin (BGP) and osteonectin) in the plasma of elderly individuals. The identification of a subpopulation of elderly individuals might thus demonstrate a group of individuals with more severe disease.

Discussion

The claims are directed to a method of "identifying a subject at risk of developing an age-related bone disorder," comprising obtaining cells from the subject, enriching for bone precursor cells, and quantifying the amount of osteocalcin or osteonectin expressed by the bone precursor cells. An increased amount of osteocalcin or osteonectin, relative to that expressed by a young or

middle-aged person, indicates that the subject is at risk of developing an age-related bone disorder.

The examiner rejected the claims as nonenabled, on the basis that the specification discloses that osteocalcin and osteonectin expression in preosteoblastic cells normally increases with increasing age; the abnormal elderly individuals are those with decreased expression of osteocalcin and/or osteonectin. See the Examiner's Answer, pages 3-4:

The specification . . . teach[es], on page 17, line 24 to page 18, line 15, that sub-sets of elderly subjects who have, or who are at risk of developing, a certain type of bone disorder, in particular osteoporosis, exhibit decreased amounts of osteocalcin or osteonectin expression on preosteoblastic cells. . . . However, the claims are drawn to an opposing scenario, in which an increased amount of osteonectin or osteocalcin expressed by bone precursor cells relative to the amount of osteocalcin or osteonectin expressed by bone-precursor cells of a young or middle-aged individual, is indicative of said subject being at risk for developing an age-related bone disorder. . . . Further, the specification teaches that age-related bone disorders are due to either a decreased number of osteoblasts or decreased osteoblast function and it is not evident how an increase in osteocalcin or osteonectin cell surface expression on preosteoblastic cells can be prognostic for an age-related bone disorder.

Examiner's Answer, pages 3-4.²

Appellants argue that the claims are enabled. "As people age, osteoporosis develops in almost all individuals, to a greater or lesser extent."

Appeal Brief, page 5. "[A]ging does cause a decreasing number of bone

² The examiner also rejected claim 92 as nonenabled because the claim includes the limitation that the initial cell population is obtained from peripheral blood, but according to the examiner, "[t]he specification teaches only bone marrow (page 5, lines 31-34) as a source of a population of cells that includes bone precursor cells." Examiner's Answer, page 4. We reverse this basis of the rejection, because the specification includes a working example showing isolation of bone precursor cells from peripheral blood. See pages 73-74.

precursor cells. . . . This, in turn, can result in bone resorption, which is the destructive aspect of many bone diseases. However, the remaining bone precursor cells apparently attempt to compensate for their lower numbers, and in doing so have increased levels of ON [osteonectin] and OC [osteocalcin]. It is this latter characteristic, and not absolute numbers, that is measured according to the present invention.” Id., pages 5-6. See also pages 12-13:

The examiner argues that, if OC and ON are known to increase with age, . . . one would expect a comparison of levels in an older person always to be higher than a younger person. However, the examiner misses the point that all individuals are different. Whereas the “normal” OC and ON levels from the control group might be established by looking at healthy individuals in the 15-40 year-old range, a ten-year old might exhibit higher OC and ON levels than the control group. This would indicate a bone disease state, or at least a risk of the disease.

Appellants conclude that “the present invention is a fairly straightforward one. ON and OC levels generally go up with age. Along with this increase, there is a concomitant increase in the risk of developing a bone disease. All the present invention seeks to do is to identify those individuals whose bone precursor cells show such increases.” Id., page 13.

“Section 112 does not require that a specification convince persons skilled in the art that the assertions therein are correct.” In re Armbruster, 512 F.2d 676, 678, 185 USPQ 152, 153 (CCPA 1975). Rather, “[w]hen rejecting a claim under the enablement requirement of section 112, the PTO bears an initial burden of setting forth a reasonable explanation as to why it believes that the scope of protection provided by that claim is not adequately enabled by the description of the invention provided in the specification of the application.” In re Wright,

999 F.2d 1557, 1561-62, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993).

In this case, we agree with Appellants that the examiner has not provided an adequate basis for doubting the enablement of the claimed method. The specification teaches that the risk of developing an age-related bone disorder generally increases as people get older. It also teaches that osteocalcin and osteonectin expression by bone precursor cells generally increases as people get older. These disclosures seem to support the operability of the claimed method; specifically, that increased osteocalcin and osteonectin expression correlates with increased risk of an age-related bone disorder.

The examiner's analysis seems to focus on the group of elderly individuals in the specification who have unusually low levels of osteocalcin and osteonectin. However, low levels of osteocalcin and osteonectin in elderly subjects are disclosed to be "indicative of an elderly subject having a particular type of osteoporosis, osteopenia or other disorder associated with age-related changes in bone formation." Specification, page 18 (emphasis added). Thus, these findings do not conflict with the claimed method of identifying a subject at risk of developing an age-related bone disorder, based on increased osteonectin or osteocalcin expression.

The examiner's concern may be that practicing the claimed method on an elderly patient is not likely to provide more information than simply asking the person how old they are. Being elderly, the patient is likely to be at increased risk of an age-related bone disorder, whether the degree of risk is assessed based on age or on osteocalcin/osteonectin expression levels. This may be true,

but as Appellants point out, an anomalously high level of osteonectin or osteocalcin expression in a younger individual may indicate a risk that was not previously appreciated.

In any event, the specification adequately discloses the claimed method, and the examiner has provided no evidence to contradict the disclosed correlation between osteonectin/osteocalcin expression and bone disorders. Thus, the evidence supports Appellants' position that the specification provides adequate guidance to enable those skilled in the art to practice the claimed method. The rejection under 35 U.S.C. § 112, first paragraph, is reversed.

Summary

The examiner has not provided a sufficient basis for doubting that the claimed method could be practiced by those of ordinary skill in the art, without undue experimentation. The rejection for nonenablement is therefore reversed.

REVERSED

Sherman D. Winters)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
William F. Smith)	
Administrative Patent Judge)	APPEALS AND
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)	INTERFERENCES
)	
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